

A new blind species of *Sinella* (Collembola: Entomobryidae) from Gutian Mountain, China

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Abstract: A new blind species of the genus *Sinella* Brook, *Sinella bui* sp. nov., is described from Gutian Mountain, Zhejiang Province, China. It is characterized by eyes absent, labial chaeta R ciliate, 4+4 central and 6+6 lateral macrochaetae on the fourth abdominal segment. It is most similar to *Sinella christianseni* Ma & Chen but differs from the latter in ciliate labial chaeta R, pointed tenent hairs, and abdominal chaetotaxy.

Key words: springtail; chaetotaxy; taxonomy

中国古田山裸长角跳属一无眼新种（弹尾纲：长角跳科）

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摘要: 记述中国浙江省古田山裸长角跳属 1 无眼新种: *Sinella bui* sp. nov.。该新种的鉴定特征为无眼, 下唇刚毛 R 纤毛化, 腹部第 4 节中央具 4+4 根大刚毛及侧面具 6+6 根大刚毛。该新种与 *Sinella christianseni* Ma & Chen 最相似, 但新种下唇刚毛 R、胫跗节近末端外侧针状黏毛、腹部毛序与后者有所不同。

关键词: 跳虫; 毛序; 分类

Introduction

In 1882, Brook established the genus *Sinella* for the worldwide *Sinella curviseta* Brook, 1882. The modern taxonomy of *Sinella* was mainly contributed by Deharveng (1990), Chen & Christiansen (1993), and Zhang *et al.* (2009, 2011). The genus *Sinella* is characterized by a reduced number of eye (0–6 on each side), pigment reduced or absent, 4-segmented antennae and Ant. IV without apical bulb, absence of body scales, labral papillae and dental spines, bidentate mucro, and polymacrochaetotaxy. So far, a total of 25 eyed and 12 blind species in this genus have been reported from China (Bellinger *et al.* 1996–2016).

Gutian Mountain from eastern China has a subtropical monsoon humid climate. The new species described in this study is the first *Sinella* species recorded from this mountain. Illustrations of the new species and detailed differences with similar species are given.

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Material and methods

Specimens were mounted, after clearing in Nesbitt's fluid, under a coverslip in Hoyer's solution, and were studied using Nikon 80i and SMZ-1000 microscopes. The Ant. III organ is described after Chen & Christiansen (1993). Dorsal body chaetae are designated following Szeptycki (1979) and Zhang *et al.* (2011). Labial chaetae follow Gisin (1967). The number of macrochaetae is given by half-tergite in the descriptions. All material is deposited in the collections of the Department of Entomology, College of Plant Protection, Nanjing Agricultural University (NJAU), China.

Abbreviations. Th. I–III—thoracic segment I–III; Abd. I–VI—abdominal segment I–VI; Ant. I–IV—antennal segment I–IV; mac—macrochaeta, -ae; mic—microchaeta, -ae; ms—S-microchaeta, -ae (microsensillum, -a); sens—ordinary S-chaeta, -ae on terga; Gr.—Group.

Taxonomy

Sinella bui sp. nov. (Figs. 1–21)

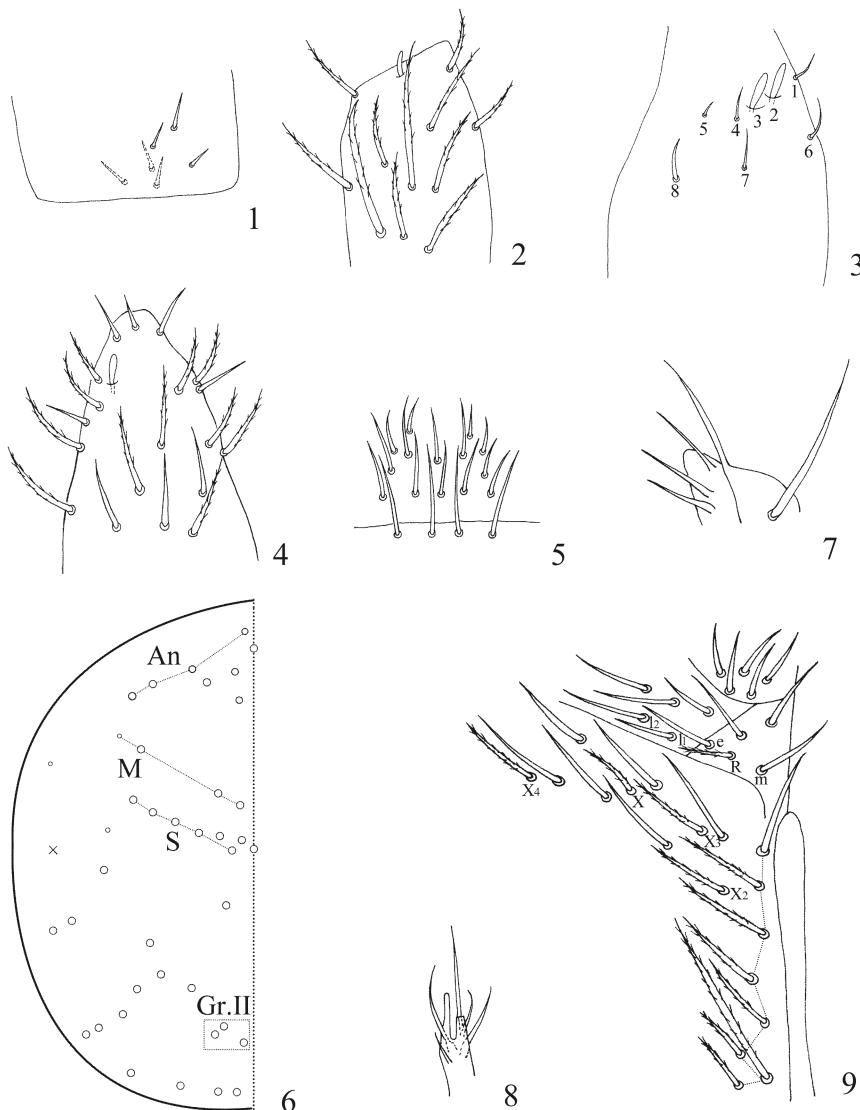
Body length up to 1.03 mm.

Head. Antennae 1.73–1.89 times as long as cephalic diagonal. Antennal segments ratio as I : II : III : IV = 1 : 1.78–2.03 : 1.84–2.16 : 3.28–4.06. Smooth spiny mic at base of antennae: 3 dorsal, 3 ventral on Ant. I (Fig. 1), 1 internal, 1 external and 1 ventral on Ant. II. Smooth straight long chaetae on antennae absent. One dorsal rod-like S-chaeta distally on Ant. II (Fig. 2). Two internal S-chaetae of Ant. III organ rod-like; chaeta 8 dagger-like (Fig. 3). Ant. IV with a knobbed subapical organ (Fig. 4). Prelabral and labral chaetae 4/ 5, 5, 4, all smooth; the five chaetae of the first row subequal in length (Fig. 5). Dorsal cephalic chaetotaxy with 4 antennal (An), 3 median (M) and 5 sutural (S) mac; Gr. II with 3 mac (Fig. 6). Mandibles with 4/5 (left/right side) teeth. Subapical chaeta of maxillary outer lobe slightly thicker than apical one; 3 smooth sublobal hairs on maxillary outer lobe (Fig. 7). Clypeal chaetae ciliate but their number unclearly seen. Lateral process of labial palp thicker than normal chaetae, with tip beyond apex of labial papilla (Fig. 8). Labial chaetae as mRel₁l₂, all smooth except R, R/m = 0.44–0.50; chaetae X and X_{2–4} ciliate; chaeta X₃ often absent. Chaetae along cephalic groove 6–8, G₁ smooth and others ciliate (Fig. 9).

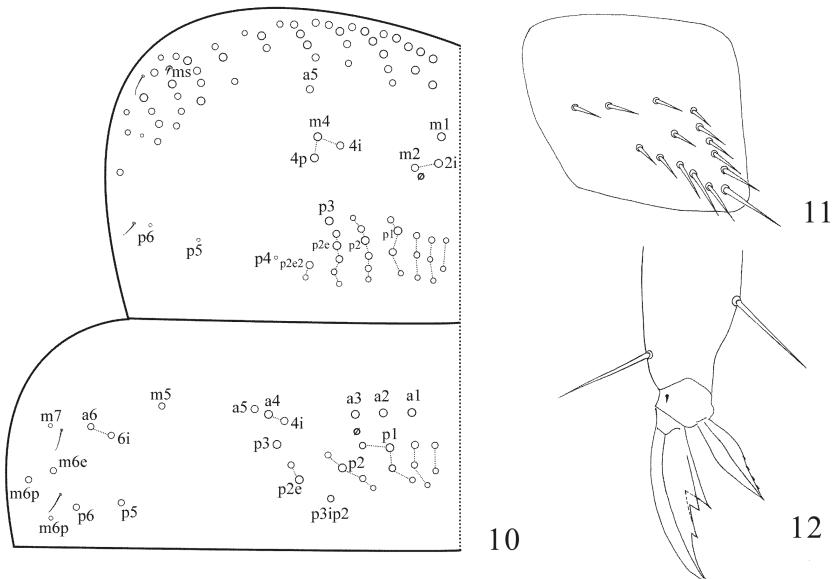
Thorax. Th. II with 3 (m1, m2, m2i) medio-medial, 3 (m4, m4i, m4p) medio-lateral, 25–26 posterior mac, 1 ms and 2 sens; ms inner to sens. Th. III with 28–30 mac and 2 lateral sens; m7 and m6p as mesochaetae (Fig. 10). Trochanteral organ with 15–20 smooth spiny chaetae; 11–14 in arms and 4–6 between them (Fig. 11). Partial inner differentiated tibiotarsal chaetae ciliate with ciliations not closely appressed to axis. Tibiotarsi distally with 10 chaetae in a whorl. Unguis with 3 inner teeth; 2 paired teeth unequal, outer one large. Unguiculus lanceolate with outer edge serrate. All tenent hairs pointed, subequal to unguiculus in length (Fig. 12).

Abdomen. Abd. IV 2.91–3.13 times as long as Abd. III along dorsal midline. Abd. I with 6 (a3, m2–4, m2i, m4p) mac, 1 ms and 1 sens; sens inner to ms. Abd. II with 4 (a3, m3, m3e, m3ep) central, 1 (m5) lateral mac and 2 sens. Abd. III with 1 (m3) central, 2 (pm6, p6) lateral mac and 2 sens; ms absent (Fig. 13). Abd. IV with 4 central (I, M, B5, A6), 6 lateral mac (D3,

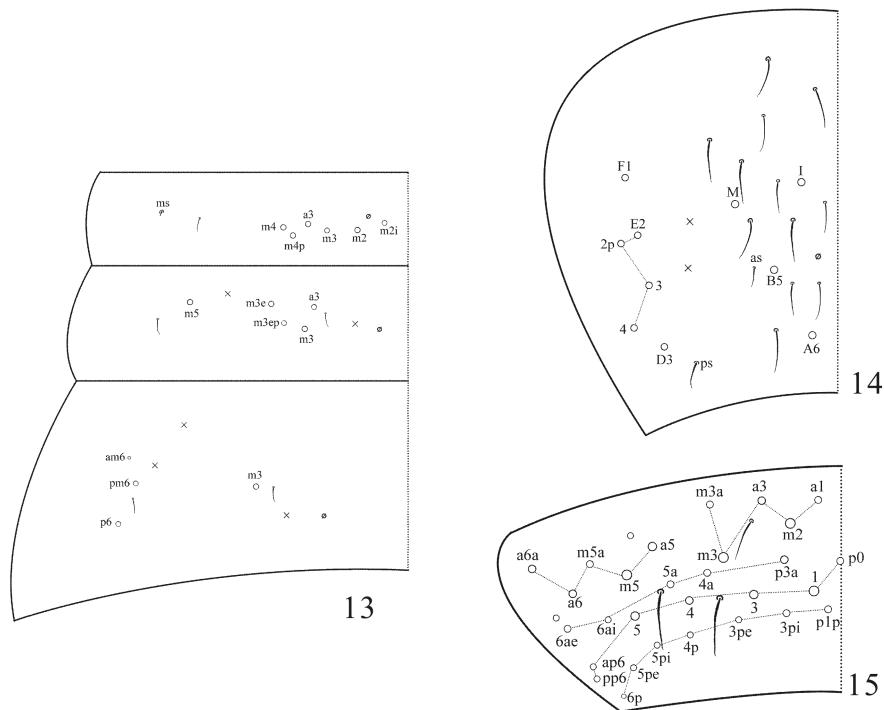
E2–4, E2p, F1) and 14 sens (Fig. 14); two sens (as, ps) of normal length and others elongate. Abd. V with 3 obvious mac (m2, m3 and m5) and 3 sens (Fig. 15). Ventral tube anteriorly with 7+7 ciliate chaetae (Fig. 16); posteriorly with 2 apical smooth and about 7 proximal weakly ciliate chaetae (Fig. 17); each lateral flap with 7 smooth and 1 ciliate chaetae (Fig. 16). Tenaculum with 4+4 teeth and one large basal chaeta (Fig. 18). Manubrium without smooth chaetae. Distal part of manubrium ventrally with 4+4 ciliate chaetae (Fig. 19). Manubrial plaque with 2 pseudopores and 2–3 ciliate chaetae (Fig. 20). Distal smooth part of dens 0.37–0.40 times as long as mucro. Mucro bidentate with basal spine short, its tip reaching apex of subapical tooth (Fig. 21).



Figures 1–9. *Sinella bui* sp. nov. 1. Basal Ant. I, dorsal view; 2. Distal part of Ant. II, dorsal view; 3. Ant. III organ, dorsal view; 4. Distal part of Ant. IV, ventral view; 5. Labral and prelabral chaetae; 6. Dorsal cephalic chaetotaxy; 7. Maxillary outer lobe; 8. Lateral process of labial palp; 9. Labial and post-labial chaetae.



Figures 10–12. *Sinella bui* sp. nov. 10. Dorsal chaetotaxy of Th. II–III; 11. Trochanteral organ; 12. Hind claw.



Figures 13–15. *Sinella bui* sp. nov. dorsal chaetotaxy. 13. Abd. I–III; 14. Abd. IV; 15. Abd. V.

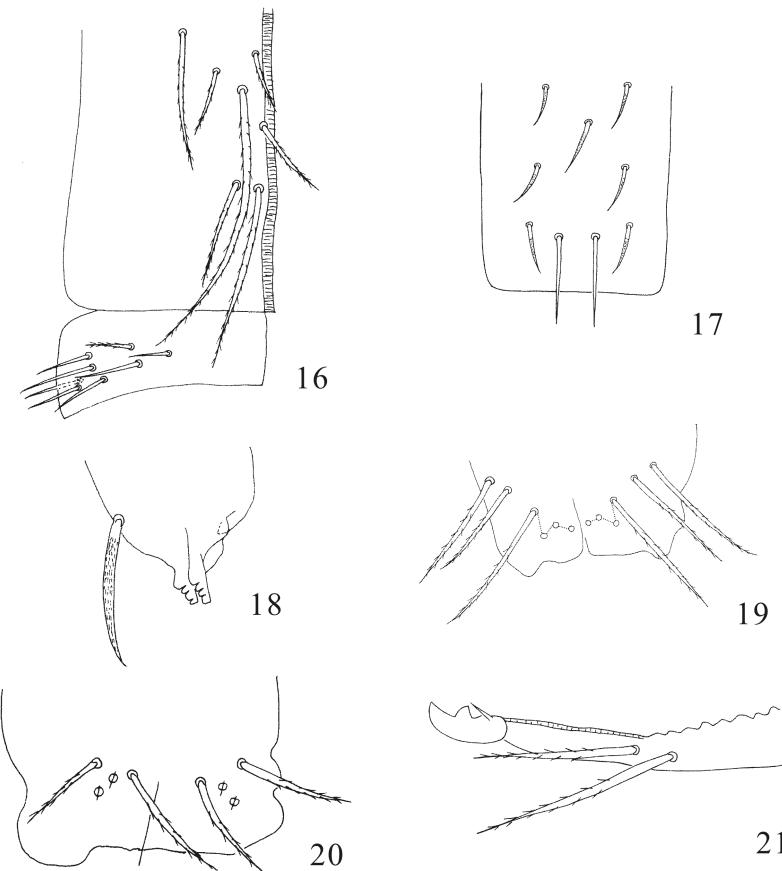
Ecology. In soil.

Holotype. ♀ on slide, **China**, Zhejiang Province, Quzhou City, Kaihua County, Gutian

Mountain, 29°16'5.64"N, 118°6'33.72"E, altitude 752 m, slide number GTS0012, collected by Xin KE & Yun BU, 11-IV-2012. **Paratypes.** ♀ adult and 2 juveniles on slides, slides number GTS0316, GTS0272 and GTS0120, collected by Yun BU, Chengwang HUANG & Wangjun CHEN, 19-VI-2012, other data same as holotype. All types deposited in NJAU.

Etymology. The specific epithet is named after Dr. Yun BU, who collected the specimens.

Remarks. This new species is characterized by eyes absent, labial chaeta R ciliate, post-labial chaetae X and X_2 ciliate, unguiculus lanceolate with outer edge serrate, short mucronal spine, and 4+4 central mac on Abd. IV.



Figures 16–21. *Sinella bui* sp. nov. 16. Anterior face and lateral flap of ventral tube; 17. Posterior face of ventral tube; 18. Tenaculum; 19. Distal part of manubrium ventrally; 20. Manubrial plaque; 21. Mucro.

It is most similar to *Sinella christianseni* Ma and Chen, 1997 in eyes absent, ciliate chaetae X, X_2 and X_4 posterior to labium, 3 inner unguis teeth, short mucronal spine, and chaetotaxy of Abd. I. However, it can be discriminated from the latter by 3 mac in Gr. II on dorsal head, ciliate R on labium, pointed tenent hairs, 4+4 central mac on Abd. II, and 4+4 central mac on Abd. IV. Also, it is similar to *Sinella browni* Chen & Christiansen, 1993 in pointed tenent hairs, short mucronal spine and chaetotaxy of Abd. I. However, it can be easily differentiated from the latter by ciliate chaetae X and X_2 posterior to labium, eyes absent, and chaetotaxy of Abd. III–IV. Detailed differences among these species are given in Table 1.

Table 1. Detailed differences among *S. bui* sp. nov., *S. christianseni* and *S. browni*.

Characters	<i>S. bui</i> sp. nov.	<i>S. christianseni</i>	<i>S. browni</i>
Eyes	0+0	0+0	2+2
Ratio of Ant./cephalic diagonal	1.73–1.89	1.5–1.9	1.4–1.8
Number of mac in Gr. II on dorsal head	3	4	3–4
Labial chaeta R	ciliate	smooth	smooth
Post-labial chaetae X and X2	ciliate	ciliate	smooth
Number of chaetae on trochanteral organ	14–20	10–14	11–13
Number of central mac on Abd. II	4+4	3+3	3+3
Number of lateral mac on Abd. III	2+2	3+3	3+3
Number of mac on Abd. IV			
central part	4+4	5+5	5+5
lateral part	6+6	5+5	5+5

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